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THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:

Bator et al.

Serial No.: 09/751,975

Group Art Unit: 3724

Filed: December 29, 2000

Examiner: Prone, Jason

For: APPARATUS AND METHOD FOR
SEPARATING CIRCUIT BOARDS

Attorney Docket No.: 199-1933 (VGT 0137 PA)

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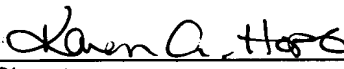
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Karen A. Hopf

BRIEF ON APPEAL

Mail Stop AF
Commissioner for Patents
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Sir:

The following Appeal Brief is submitted pursuant to the Notice of Appeal
filed on April 19, 2004, for the above-identified application.

The Commissioner is authorized to charge the fee for filing the Brief on Appeal to Deposit Account No: 50-0476.

I. Real Party in Interest

The real party in interest in this matter is Visteon Global Technologies, Inc., Dearborn, Michigan (hereinafter "Visteon").

II. Related Appeals and Interferences

There are no other known appeals or interferences which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

III. Status of the Claims

Claims 1-21 stand rejected in the Final Office Action. A copy of the claims on appeal is attached as an Appendix.

IV. Status of Amendments Filed After Final

There have been no amendments filed subsequent to the final rejection.

V. Summary of the Invention

The present invention is an apparatus for separating a multiple circuit board array 20 into a plurality of individual circuit boards 10 such that multiple board arrays 20 can be produced and automatically divided up into individual circuits 20.

The present invention solves problems associated with breaking a multiple board array 20 into a plurality of individual circuit boards 10. These include that common configuration wherein connecting pins 18 commonly extend of f the sides of the circuit boards 12. In addition, the circuit boards 10 include a plurality of electronic components 16 mounted on the circuit board 12. Therefore, mechanical systems must be developed by which to snap the individual circuit boards 10 from the multi-board array 20 without damaging the connecting pins 18

which extend over the pre-scored planes 28 or loading electrical components 16. Securing and loading the multiple board array 20 is also difficult as the electronic components 16 cannot commonly support any form of loading. The present invention addresses this by using a splitting element 36 aligned with a pre-scored plane 28, on the multiple board array 20. A torque inducing element 38 induces edge loading on the multiple board array 20 such that the individual circuit board 10 can be broken off the multiple board array 20 without loading the electrical components 16 are damaging the connecting pins 18. The present invention utilizes a shield element 14 to prevent direct loading of the electrical components. Flexing of the circuit board 12 during separation from the multiple board array 20 can damage the components 16 or their electronic connection to the circuit board 12. Therefore, the present invention includes a stabilizing element 44 which exerts a load on the multiple board array 20 to reduce flex.

VI. Issues

The following issue is presented in this appeal, corresponding directly to the Examiner's final ground for rejection and the Final Office Action:

- a) Whether claims 1 and 4 under 35 USC 102(b) are anticipated by DeRoo, Sr. (US 5,809,858).
- b) Whether claims 2 and 3 are patentable with regard to 35 USC 103(a) over DeRoo, Sr. in view of Deshet (US 4,856,399).
- c) Whether claim 5 is patentable with regard to 35 USC 103(a) over DeRoo, Sr. in view of Fetouh (US 4,569,109).
- d) Whether claims 6-8 are patentable with regard to 35 USC 103(a) over DeRoo in view of Duecker (US 5,927,582).
- e) Whether claims 9,12,14,15, and 20 are patentable with regard to 35 USC 103(a) over DeRoo in view of Duecker.

- f) Whether claims 10 and 11 are patentable with regard to 35 USC 103(a) over DeRoo in view of Duecker in further view of Deshet.
- g) Whether claim 13 is patentable with regard to 35 USC 103(a) over DeRoo in view of Duecker in further view of Fetouh.
- h) Whether claims 16-19 and 21 are patentable with regard to 35 USC 103(a) over DeRoo, Sr. in view of Duicker, Deshet, and Fetouh as applied to claims 1-15 and 20 in further view of Sutton.

VII. Grouping of Claims

The rejected claims have been grouped as stated in issues a-h above by the Examiner in the final rejection. The Applicant, respectfully, accepts the eight sets of groupings for the purpose of this appeal.

VIII. Argument

The Rejection of Claims 1 and 4 rejected under 35 USC 102(b)

Claims 1 and 4 stand rejected under 35 USC 102(b) as being anticipated by DeRoo, Sr. (US 5,809,858). The Examiner asserts that DeRoo teaches using a splitting elements (Fig 3), a torque inducing element (11), loading the work piece onto the splitting element and breaking the work piece, and that the torque inducing element is capable of forcing a multiple board array without loading electrical components(Fig 3), and that the splitting element is a wedge(Fig 3). See paragraph 2, final office action dated December 19, 2003.

The Applicant respectfully traverses this rejection on several grounds and requests the Board's reconsideration. The Applicant respectfully asserts that The Applicant respectfully traverses this rejection on several grounds. First off, the Applicant respectfully reasserts that the DeRoo patent is non-analogous art and therefore is not proper prior art. It is clearly not in the field of endeavor of

electronic circuit production as is the present invention nor is it reasonably pertinent to the problem at hand. The DeRoo reference teaches a machine for "cutting and scoring paper, plastic, leather, cloth, metal, and other like materials" (see abstract). The DeRoo reference does not teach in the area of splitting/breaking circuit boards as claimed by the present invention. The DeRoo reference is a material scoring/cutting reference and not a finesse breaking apparatus as claimed by the present invention. The DeRoo reference does not teach edge loading the circuit board such that the splitting element breaks it along a pre-scored plane as claimed by the present invention. Rather DeRoo reference is a device for processing raw-materials and is not applicable to splitting apart individual circuit boards from a multiple board array. The simple two sided large surface presses 11,10 of the DeRoo reference would result in damage to the underside (or topside) of a preassembled circuit board placed within it. The DeRoo reference teaches the processing of materials that are not sensitive to surface loading as are the boards processed by the claimed apparatus. The Applicant, therefore, asserts that the DeRoo reference is non-analogous and should not be used against the present invention.

Furthermore, the DeRoo reference does not teach all the limitations of the present invention contained in claims 1 and 4. The DeRoo reference does not teach the processing of a multiple board array with pre-scored planes and a plurality of electrical components. The DeRoo reference does not teach positioning the splitting element along a pre-scored plane. The DeRoo reference does not teach edge loading the board (the DeRoo reference surface loads the material using cutting plate 11). And most significantly, the DeRoo reference does not teach edge loading to force the board into the splitting element to "break the multiple board array along the pre-scored plane" and the torque inducing element "without loading the plurality of electrical components" (claim 1). DeRoo fails to teach these limitations and therefore this rejection is improper. The

Applicant, therefore, respectfully requests reconsideration. The Board is requested to reverse the Examiner in light of these failures.

The Examiner, however, only tacitly addressed these arguments by way of stating: "It is true that these patents do not disclose the splitting of a circuit board, however, an apparatus to cut a specific work piece is being claimed and not a method to cut a circuit board" and "The fact that this apparatus cuts a circuit board does not further limit the structure of the apparatus making the cuts". This was written in response to claims 1-15 and 20 and therefore must be responded to in regards to the individual claim groups. As for claims 1 and 4, the above referenced limitations clearly identify "multiple board array", "pre-scored plane", "plurality of electrical components", and a torque element that can induce torque in the board array without loading the plurality of electrical components. Clearly these are structural limitations. Under the Examiner's premise that the Applicant is simply claiming a new use for the DeRoo reference, the Applicant strenuously disagrees. The combination of edge loading and torque inducing without loading the electrical components are real and tangible structural limitations not taught by DeRoo. The fact that a circuit board may be put in the DeRoo device and split, with disastrous ramifications to the resultant's circuit board structure, does not address the limitations cited. Each limitation of the present invention must be properly addressed by the cited references. Since they are not, the Applicant respectfully requests the Board's reconsideration.

The Rejection of Claims 2 and 3 under 35 USC 103(a)

Claims 2 and 3 stand rejected under 35 USC 103(a) as being unpatentable over DeRoo, Sr. in view of Deshet (US 4,856,399). The Examiner asserts that DeRoo teaches the limitations with the exception of the stabilizing elements, that Deshet teaches such a stabilizing element, and that it would have been obvious to combine.

The Applicant respectfully traverses the Examiner's rejections and requests the Board's reconsideration. In addition to the above assertion that DeRoo is non-analogous, the Applicant asserts that Deshet is non-analogous. The Applicant asserts that Deshet is also an apparatus for stamping thin sheet blank material (see col 1, 5-9). This reference as well does not teach the structure necessary to process multiple board arrays having installed electronic components as claimed by the present invention. The Deshet reference utilizes a blank holder 3 not, as asserted, a stabilizing element as claimed by the present invention. the stabilizing element of the present invention "reduces board flex" while the Deshet blank holder 3 pins down the blank for stamping. A multiple circuit board with electronic components placed into Deshet (or DeRoo for that matter) would result in a plurality of destroyed electronic components. Nether reference edge loads to avoid loading the electronic components, neither reference aligns a splitting element along a pre-scored plane, and neither reference induces torque without loading the electrical components. Therefore neither the DeRoo nor the Deshet references either alone or in combination with the present invention teach the limitations of the present invention and the rejection should be removed.

The Applicant respectfully asserts failure of either reference to teach: edge loading, positioning along a pre-scored plane; splitting along a pre-scored plane; reducing board flex; and torque induction without loading electrical components mounted on the board array. The Applicant again asserts that these are tangible, real, and structural limitation not taught by either reference. Furthermore, no direct response has been made to these assertions. The Applicant argues that the argument that the cited reference could split a circuit board is inappropriate as in order to read on the present application they must not only split the board, but do so in the same manner using identical structures, and incorporate every limitation of the present invention. They do not. The assertion that the limitations referencing the circuit board or electrical components are not structural limitations

is inaccurate. To assume they hold no structural limitations is to assume a steamroller is an appropriate tool to crack an egg. The Applicant, therefore, requests the Board's reconsideration.

The Rejection of Claim 5 under 35 USC 103(a)

Claim 5 stand rejected under 35 USC 103(a) as being unpatentable over DeRoo, Sr. in view of Fetouh (US 4,569,109). The Applicant appeals this rejection and incorporates by reference the objections to the DeRoo reference discussed above. The Applicant additionally traverse the Fetouh reference as non-analogous. The Applicant would like to state his position regarding a number of the references cited. Although the Applicant asserts that the cited references do not teach every limitation of the present invention, the Applicant also asserts they are non-analogous. The Applicant notes that while the functions of some of the references may appear to be similar, it is comparable to looking to a sledge hammer to kill a flea on a china dish. Would the flea be dead in the end, probably. But would one seriously look to such a teaching when looking to solve the problem at hand... no. The stamping of metal blanks, the cutting of metal sheets, the use of large flat pressing panels, the tearing of cardboard, and the splitting of glass would all place the assembled circuit boards in a position similar to the aforementioned china dish. The limitations of the present claims, therefore, must be considered in total in regards to the art to which they are directed. The Applicant submits that neither the DeRoo nor the Fetouh reference, either alone or in combination, teach all the limitations of the present invention. The Applicant submits that neither the DeRoo nor the Fetouh reference, either alone or in combination, teach all the limitations of the present invention. Therefore, the Applicant asserts that the rejection is improper and should be removed.

The Rejection of Claims 6-8 under 35 USC 103(a)

Claims 6-8 stand rejected under 35 USC 103(a) as being unpatentable over DeRoo in view of Duecker (US 5,927,582). The Examiner asserts that DeRoo teaches the limitations of the present invention with the exception of a transport element with a plurality of wheels and the torque element being a pneumatic lever. The Examiner asserts that Duecker teaches these limitations and that it would have been obvious to combine these references to arrive at the present invention.

The Applicant appeals these rejections and reasserts the objections to the DeRoo reference. In addition the Applicant reasserts the objections to the Duecker reference as asserted throughout prosecution as non-analogous art. The references cited do not teach the limitations of the present invention, the references are non-analogous and therefore not prior art, and that improper motivation to combine has been established. The Applicant again notes that Duecker teaches clamping and ripping apart cardboard, not stabilizing and breaking circuit boards as claimed by the present invention. As previously argued, the nature, scale, physics and methodologies utilized by these references do not contain all the limitations of the present invention and are not within its field of endeavor. The Applicant asserts that the references do not teach the limitations of the present invention, the references are non-analogous and therefore not prior art, and that improper motivation to combine has been established. Therefore, the Applicant respectfully asserts the rejection was improper.

The Rejection of Claims 9,12,14,15, and 20 under 35 USC 103(a)

Claims 9,12,14,15, and 20 were rejected over DeRoo in view of Duecker. The Applicant respectfully incorporates all the above arguments regarding DeRoo and Duecker. Rather than repeating identical arguments regarding these two references and the limitations of claims 9, 12, 14, and 15 which are contained and

argued as above for claims 1-8, the Applicant would like to concentrate on limitations not present in the cited references that have thus far not been addressed.

The Applicant appeals these rejections. The Applicant notes that neither reference teaches the claimed limitation of a shield element placed over the electronic components wherein the torque is safely applied through the shield elements. This is quite significant as it is notable that the cited references not only don't utilize or teach shield elements but do not need them as they are non-analogous art. As the cited references were never intended to deal with circuit boards loaded with electronic components, they do not teach such a limitation. The materials processed by the cited references are not as fragile nor similarly damaged as circuit boards. This further emphasizes not only these references failure to teach the cited limitations of the present claims but their non-analogous nature.

The rejection of these claims is improper as the cited claim limitations pointed out by the Applicant have not been addressed.

The Rejection of Claims 10 and 11 under 35 USC 103(a)

Claims 10 and 11 stand rejected under 35 USC 103(a) as being unpatentable over DeRoo in view of Duecker in further view of Deshet. The Applicant appeals this rejection and again reasserts the objections to DeRoo, Duecker, and Deshet. The Applicant asserts as above that the cited references fail to teach the limitations of the present invention. The Applicant further asserts that there is improper motivation to combine a flat die-cutting material device, a cardboard ripping device, and a sheet metal stamping device to arrive at the claimed apparatus for snapping apart individual circuit boards from a multiboard array. The Applicant further notes that the assertion that Deshet teaches a stabilizing device as opposed to a clamping device is incorrect. The present

invention claims a stabilizing device to reduce board flex. This is not taught by the cited references. It is noted, however, that the underlying claim limitations (as previously argued) are not contained within DeRoo or Duecker and therefore the rejection is improper even without regard to Deshet or the lack of motivation to combine.

The rejection of Claim 13 under 35 USC 103(a)

Claim 13 stands rejected under 35 USC 103(a) as being unpatentable over DeRoo in view of Duecker in further view of Fetouh. The Applicant appeals and reincorporates all the previous arguments regarding the failure of DeRoo and Duecker to teach the underlying limitations of the claimed invention. In addition, The Applicant asserts that improper motivation to combine has been established. The Applicant, therefore asserts a rejection of these claims is improper and requests the Board's reconsideration.

The Rejection of Claims 16-19 and 21 under 35 USC 103(a)

Claims 16-19 and 21 stand rejected under 35 USC 103(a) as being unpatentable over DeRoo, Sr. in view of Duicker, Deshet, and Fetouh as applied to claims 1-15 and 20 in further view of Sutton. The Applicant notes that these rejections were presented for a first time in the present final office action and therefore should not properly be the basis of a final rejection. The Applicant notes further that no motivation to combine was evidenced in the office action from any of the plurality of references strung together for this rejection. The Applicant notes that the Sutton reference teaches a shearing cut to separate circuit boards which is precisely the prior art the present invention was designed to improve on. The Sutton reference shearing requires electronic components cannot be located too close to the shear line, does not teach reduction of board flex, or the use of shield elements to transfer torque without loading the electronic components. The

cited references do not teach any of these limitations either. To combine these references to come anywhere near the method limitations of the present invention requires the complete suspension of the concept of motivation-to-combine. Especially in regards to the method claims of the present invention, no sufficient support for an obviousness rejection has been supplied. Section 103 specifically requires evaluation of the claimed invention as a whole. A part by part identification of different limitations in the cited references is improper. *Env'tl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 698 (Fed. Cir. 1983).

Additionally, the Applicant notes that none of the references teaches the claimed limitation of a shield element placed over the electronic components wherein the torque is safely applied through the shield elements. This is quite significant as it is notable that the cited references not only don't utilize or teach shield elements but do not need them as they are non-analogous art. As the cited references were never intended to deal with circuit boards loaded with electronic components, they do not teach such a limitation. The materials processed by the cited references are not as fragile nor similarly damaged as circuit boards. This further emphasizes not only these references failure to teach the cited limitations of the present claims but their non-analogous nature. The Applicant, therefore, requests the Board's reconsideration and reversal of these rejections.

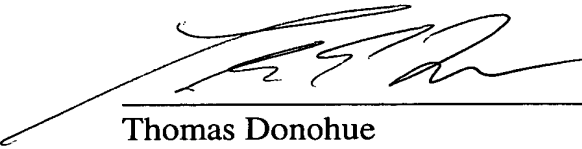
IX. Appendix

A copy of each of the claims involved in this appeal, namely claims 1-21 is attached hereto as Appendix A.

X. Conclusion

For the foregoing reasons, Applicant respectfully requests that the Board direct the Examiner in charge of this examination to withdraw the rejections.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'T. Donohue', is written over a horizontal line.

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Dated: June 21, 2004

APPENDIX A

1. An apparatus for separating individual circuit boards from a multiple board array with pre-scored planes and a plurality of electrical components comprising:

at least one splitting element positioned along one of the pre-scored planes; and

at least one torque inducing element using edge loading to mechanically force the multiple board array onto said at least one splitting element and thereby breaking the multiple board array along the pre-scored plane said at least one torque inducing element forcing the multiple board array without loading the plurality of electrical components.

2. An apparatus as described in claim 1 further comprising:

a stabilizing element exerting a load on the surface of the multiple board array and thereby reducing board flex.

3. An apparatus as described in claim 2 wherein said stabilizing element includes a plate element; and

a plurality of spring elements, said plurality of spring elements pushing said plate element onto the multiple board array.

4. An apparatus as described in claim 1 wherein said at least one splitting element is wedge shaped.

5. An apparatus as described in claim 1 wherein said at least one splitting element is block shaped.

6. An apparatus as described in claim 1 further comprising:

a transport element for automatically positioning said at least one splitting element along one of the pre-scored planes.

7. An apparatus as described in claim 1 wherein said transport element includes a plurality of wheels.

8. An apparatus as described in claim 1 wherein said at least one torque moving element is a pneumatic lever.

9. An apparatus for separating individual circuit board from a multiple board array with pre-scored planes and a plurality of electrical components comprising:

at least one splitting element positioned along one of the pre-scored planes; and

at least one torque inducing element using surface loading to mechanically force the multiple board array onto said at least one splitting element and thereby breaking the multiple board array along the pre-scored plane said at least one torque inducing element forcing the multiple board array without loading the plurality of electrical components; and

a transport element for automatically positioning said at least one splitting element along one of the pre-scored planes.

10. An apparatus as described in claim 9 further comprising:

a stabilizing element exerting a load on the surface of the multiple board array and thereby reducing board flex.

11. An apparatus as described in claim 10 wherein said stabilizing element includes a plate element; and

a plurality of spring elements, said plurality of spring elements pushing said plate element onto the multiple board array.

12. An apparatus as described in claim 9 wherein said at least one splitting element is wedge shaped.

13. An apparatus as described in claim 9 wherein said at least one splitting element is block shaped.

14. An apparatus as described in claim 9 wherein said transport element includes a plurality of wheels.

15. An apparatus as described in claim 9 wherein said at least one torque moving element is a pneumatic lever.

16. A method for separating individual circuit boards from a multiple board array with pre-scored planes comprising:

positioning a splitting element along one of the pre-scored planes,
and

inducing torque on the multiple board array such that the multiple board array is forced onto the splitting element and breaks along the pre-scored plane.

17. A method for separating individual circuit boards as described in claim 16 further comprising:

loading the surface of the multiple board array to reduce board flex.

18. A method of separating individual circuit boards from a multiple board array as described in claim 16 further comprising:

transporting the multiple board array using a plurality of wheels.

19. A method of separating individual circuit boards from a multiple board array with pre-scored planes as described in claim 16 further comprising:

repeating said positioning and said inducing torque on each pre-scored plane.

20. An apparatus as described in claim 9 wherein said torque inducing element applies said surface loading to the multiple board array by way of a shield element attached to the multiple board array such that the plurality of electrical components remain undamaged.

21. A method as described in claim 16 wherein said inducing torque on the multiple board array includes transferring load from a torque inducing element through a shield element into the multiple board array.